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10/709,462	05/07/2004	Hou-Wei Lin	REAP0033USA	3461

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EXAMINER	
PEREZ, JAMES M	
ART UNIT	**PAPER NUMBER**
2611	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/709,462	Applicant(s) LIN ET AL.	
	Examiner James M. Perez	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 31 July 2007.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4,8,9 and 11-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4,8,9 and 11-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 07 May 2007 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This response is responsive to amendments in application 10/709,462, filed on 31 July, 2007. Claims 1-4,8-9, and 11-20 are pending and have been examined.

Response to Arguments

2. Applicant's argument with respect to claims Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection because a new reference was found for a rejection as shown below. Examiner also withdraws the indicated allowance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1,9, and 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (USPN 6873279) in view of Kuo (USPN 7145968).

<u>With regards to claims 1 and 12</u>, Jones teaches a signal processing device for processing a received signal to generate a sliced signal (**fig. 1: output of element 116**), comprising:

an equalizer (**fig. 1: element 112**) for generating an equalized signal according to the received signal (**fig. 1: output of element 112**);

a multilevel quantizer (**fig. 1: element 116**) coupled with the equalizer (**fig. 1: element 112 to 116**) for selectively utilizing a first amount of one or more thresholds (**fig. 3a: Max 0, Min1, Max1, and Min2: col. 2, col. 7, line 39 to col. 8, line 39**) or a second amount of one or more thresholds (**fig. 3a: $T_{0\text{-}1}$ and $T_{1\text{-}2}$**) to quantize the equalized signal in order to generate the sliced signal (**fig. 1: output of element 116**), wherein the first amount is different from the second amount (**col. 7, lines 39 to col. 8, lines 39: note that the first and second amounts have the capability to have different values therefore they are different from each other**);

a control logic (**col. 2, lines 37-40**) for controlling the multilevel quantizer to quantize the equalized signal by the first amount of threshold/thresholds or the second amount of threshold/thresholds (**col. 4, lines 26-33**);

Jones is silent with respect to teaching a control logic controls the multilevel quantizer by executing the following steps: comparing the equalized signal with a predetermined level for a first difference; comparing the equalized signal with a predetermined constant for a second difference; controlling the multilevel quantizer to quantize the equalized signal by the first amount of threshold/thresholds for the sliced signal, in the case of the first difference and the second difference having the same signal (positive/negative); and controlling the multilevel quantizer to quantize the equalized signal by the second amount of threshold/thresholds for the sliced signal, in the case of the first difference and the second difference having different signs (positive/negative)

Kuo teaches the control logic which controls the multilevel quantizer by executing the following steps:

Comparing the equalized signal with a predetermined level for a first difference (**fig. 4: col. 4, lines 29-47: absolute value of the signal and DC+threshold**);

Comparing the equalized signal with a predetermined constant for a second difference (**fig. 4: DC level: col. 4, lines 29-47**);

Controlling the multilevel quantizer to quantize the equalized signal by the first amount of threshold/thresholds for the sliced signal, in the case of the first difference and the second difference having the same signal (**first mode**) (positive/negative) (**fig. 4: col. 4, lines 29-47**); and

Controlling the multilevel quantizer to quantize the equalized signal by the second amount of threshold/thresholds for the sliced signal, in the case of the first difference and the second difference having different signs (**second mode**) (positive/negative) (**fig. 4: col. 4, lines 29-47**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

<u>With regards to claim 9</u>, Jones in view of Kuo teaches the device of claim 1.

Jones is silent with respect to teaching the control logic wherein the control logic controls the multilevel quantizer according to the following steps: controlling the

multilevel quantizer to quantize the equalized signal by the first amount of threshold/thresholds for the sliced signal, in the case of the first difference being less than a predetermined value and the first difference and the second difference having the same sign (positive/negative); and controlling the multilevel quantizer to quantize the equalized signal by the second amount of threshold/thresholds for the sliced signal, in the case of the first difference being larger than the predetermined value and the first difference and the second difference having different signs (positive/negative).

Kuo teaches the control logic wherein the control logic controls the multilevel quantizer according to the following steps:

controlling the multilevel quantizer to quantize the equalized signal by the first amount of threshold/thresholds for the sliced signal, in the case of the first difference being less than a predetermined value and the first difference and the second difference having the same sign (positive/negative) (**fig. 4: col. 4, lines 29-47**); and

controlling the multilevel quantizer to quantize the equalized signal by the second amount of threshold/thresholds for the sliced signal, in the case of the first difference being larger than the predetermined value and the first difference and the second difference having different signs (positive/negative) (**fig. 4: col. 4, lines 29-47**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

With regards to claim 11, Jones in view of Kuo teaches the device of claim 1.

Jones further teaches the device wherein the sliced signal output by the multilevel quantizer has a plurality of bits (**fig. 3A: note that the signal is sliced into more than 2 numbers, therefore the output of the slicer has to contain a plurality of bits**).

With regards to claim 13, Jones in view of Kuo teaches the signal processing device of claim 12. Jones is silent to teaching the control logic further executing the following step: determining whether the first value is less than a predetermined value, so as to determine that the quantizer is in the first status or second status.

Kuo teaches the control logic further executing the following step:

determining whether the first value is less than a predetermined value, so as to determine that the quantizer is in the first status or second status (**fig. 4: col. 4, lines 29-47: absolute value and DC level+Threshold**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

With regards to claim 14, Jones in view of Kuo teaches claim 12.

This claim is reject under the same rationale as claim 1 above.

With regards to claim 15, Jones in view of Kuo teaches claim 14.

This claim is reject under the same rationale as claim 1 above. Note that "same/different attribute" is equivalent to the "same/different sign" in claim 1.

With regards to claim 16, Jones in view of Kuo teaches claim 12.

This claim is reject under the same rationale as claim 1 above. Note that "substantially correct/incorrect" is equivalent to the "same/different sign" in claim 1.

With regards to claim 17, Jones teaches a signal processing method for generating a sliced signal according to a received signal, comprising:

generating an equalized signal (**fig. 1: element 112**) according to the received signal (**fig. 1: input signal from Channel**);

generating the sliced signal (**output of element 116**) according to the equalized signal and a first amount of threshold/thresholds when a first sliced mode is applied (**fig. 3a: Max 0, Min1, Max1, and Min2: col. 2, col. 7, line 39 to col. 8, line 39**), and generating the sliced signal (**output of element 116**) according to the equalized signal (**fig. 1: elements 112 coupled to element 116**) and a second amount of threshold/thresholds when a second sliced mode is applied (**fig. 3a: current $T_{0\text{-}1}$ and $T_{1\text{-}2}$**).

Jones is silent with respect to teaching the slicer applying one of the first slice mode and the second slice mode according to the follow steps: subtracting the equalized signal from a predetermined level to obtain a first value; determining whether

the sliced signal is substantially correct or substantially incorrect according to the first value; if the sliced signal is substantially correct, applying the first slice mode; and if the sliced signal is substantially incorrect, applying the second slice mode; wherein the first amount of threshold/thresholds is different from the second amount of threshold/thresholds.

Kuo teaches the slicer applying one of the first slice mode and the second slice mode according to the follow steps:

subtracting the equalized signal from a predetermined level to obtain a first value (**fig. 4: col. 4, lines 29-47: absolute value of the signal and DC+threshold**);

determining whether the sliced signal is substantially correct or substantially incorrect according to the first value (**fig. 4: col. 4, lines 29-47: absolute value of the signal and DC+threshold**);

if the sliced signal is substantially correct, applying the first slice mode (**fig. 4: col. 4, lines 29-47**); and

if the sliced signal is substantially incorrect, applying the second slice mode; wherein the first amount of threshold/thresholds is different from the second amount of threshold/thresholds (**fig. 4: col. 4, lines 29-47**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

With regards to claim 18, Jones in view of Kuo teaches the method of claim 17.

Jones is silent with respect to teaching the method further comprising the following step: determining whether the first value is less than a predetermined value, so as to determine that the sliced signal is substantially correct or substantially incorrect.

Kuo teaches the method further comprising the following step:

determining whether the first value is less than a predetermined value, so as to determine that the sliced signal is substantially correct or substantially incorrect (**fig. 4 and fig. 9: col. 4, lines 29-47: absolute value of the signal and DC+threshold**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

With regards to claim 19, Jones in view of Kuo teaches the method of claim 17.

Jones is silent with respect to teaching the method further comprising the following steps: subtracting the equalized signal from a predetermined constant to obtain a second value; and comparing the first value with the second value, so as to determine that the sliced signal is substantially correct or substantially incorrect.

Kuo teaches the method further comprising the following steps:

subtracting the equalized signal from a predetermined constant to obtain a second value (**fig. 4 and fig. 9: col. 4, lines 29-47**); and

comparing the first value with the second value, so as to determine that the sliced signal is substantially correct or substantially incorrect (**fig. 4 and fig. 9: col. 4, lines 29-47**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

<u>With regards to claim 20</u>, Jones in view of Kuo teaches the method of claim 19.

Jones is silent with respect to teaching the method further comprising: comparing the first value with the second value, so as to determine whether the first and second values have the same attribute and thereby determine that the sliced signal is substantially correct or substantially incorrect.

Kuo teaches the method further comprising: comparing the first value with the second value, so as to determine whether the first and second values have the same attribute and thereby determine that the sliced signal is substantially correct or substantially incorrect (**fig. 4 and fig. 9: col. 4, lines 29-47**).

Therefore it would be obvious to one of ordinary skill at the time that the invention was made to modify the teachings of Jones in view Kuo in order to shorten the amount of time consumed for mending errors caused by continuous decoding operations in a Viterbi decoder (**Kuo: col. 1, line 54 to col. 2, line 4**).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (USPN 6873279) in view of Kuo (USPN 7145968) as applied to claim 1 above, and further in view of Jayaraman (USPN 7046726).

With regards to claim 2, Jones in view of Kuo teaches the device of claim 1. Jones teaches an adaptive equalizer which could be a feed-forward equalizer (FFE), or a feed-forward equalizer (FFE) (**Jones fig. 1: 112; col. 6 lines 4-7**).

Jones in view of Kuo are silent with respect to teaching the device comprises a feed-forward equalizer (FFE), and feed-back equalizer (FBE), and an adder coupled respectively with the FFE and the FBE for outputting the equalized signal according to signals outputted from the FFE and the FBE.

Jayaraman teaches the device wherein the equalizer comprises a feed-forward equalizer (FFE) (**fig. 2: element 306**), and feed-back equalizer (FBE) (**fig. 2: element 310**), and an adder (**fig. element 308**) coupled respectively with the FFE and the FBE for outputting the equalized signal according to signals outputted from the FFE and the FBE (**fig. 2**).

Therefore, it would have been to one of ordinary skill in the art at the time of the invention to modify Jones with the teaching of Jayaraman since Jones teaches FFE or FBE and Jayaraman teaches the beneficial use of FFE and FBE (Jayarama fig. 2: 306, 310) such as to reduce linear distortion over a variety of operating conditions (Jayarama col. 1 line 55-60) in the analogous art of equalization.

6. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (USPN 6873279) in view of Kuo (USPN 7145968) as applied to claim 1 above, and further in view of Strolle USPN (5799037).

With regards to claim 3, Jones in view of Kuo teaches the device of claim 1.

Jones in view of Kuo are silent with respect to teaching a derotator coupled between the equalizer and the multilevel quantizer for derotating the equalized signal and inputting the derotating equalized signal into the multilevel quantizer; and a rotator coupled between the multilevel quantizer and the equalizer for rotating the sliced signal outputted from the multilevel quantizer and inputting the rotated sliced signal into the equalizer.

Strolle teaches a derotator (fig. 7: element 903) coupled (electrically coupled) between the equalizer (fig. 7: element 900) and the multilevel quantizer (fig. 7: element 905: col. 14, lines 16 to 19) for derotating the equalized signal (fig. 7: output of element 900) and inputting the derotated equalized signal into the multilevel quantizer (fig. 7: input of element 905); and a rotator (fig. 7: elements 916 and 918) coupled between the multilevel quantizer (fig. 7: element 905) and the equalizer (fig. 7: element 900) for rotating the sliced signal outputted from the multilevel quantizer (fig. 7: element 905) and inputting the rotated sliced signal into the equalizer (fig. 7: element 902). Both rotators perform their function on the signal outputted from the multilevel quantizer (fig. 7: element 905) and the signals outputted from the rotators lead to the input of the

adaptive equalizer (fig. 7: element 900); therefore the rotators are coupled between the multilevel quantizer and the equalizer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Jones in view of Kuo with the teaching of Strolle since Strolle teaches the beneficial use of rotator and derotator elements such as create a receiver that demodulates a plurality of signal formats using common circuitry (**Strolle: col. 1, lines 50-53**) in the analogous art of equalization.

With regards to claim 4, Jones in view of Kuo in further view of Strolle teaches the device of claim 3. Jones in view of Kuo are silent with respect to teaching the device wherein the rotator is coupled with a feed-back equalizer (FBE) of the equalizer for rotating the sliced signal, and the rotated sliced is a passband signal ().

Strolle teaches the device wherein the rotator (fig. 7: elements 918 and 916) is coupled with a feed-back equalizer (FBE) of the equalizer for rotating the sliced signal (**fig. 7: elements 936 and 938**), and the rotated sliced is a passband signal (**signal from the channel obviously a passband signal since it is a signal passing through the channel and the channel obviously has a limited bandwidth**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Jones in view of Kuo with the teaching of Strolle since Strolle teaches the beneficial use of rotator and derotator elements such as create a receiver that demodulates a plurality of signal formats using common circuitry (**Strolle: col. 1, lines 50-53**) in the analogous art of equalization.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jones (USPN 6873279) in view of Kuo (USPN 7145968) as applied to claim 1 above, and further in view of Samarasooriya (US 20010024479).

With regards to claim 8, Jones in view of Kuo teaches the device of claim 1.

Jones in view of Kuo are silent with respect to teaching the device wherein the predetermined constant is determined by a constant modulus algorithm.

Samarasooriya teaches the device wherein the predetermined constant is determined by a constant modulus algorithm (**paragraph 3**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Jones in view of Kuo with the teaching of Samarasooriya in order to provide an enhanced method and system for alleviating the adverse effects of pipeline delays in a carrier recovery loop when the system (**Samarasooriya: paragraphs 1 and** 6).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Perez whose telephone number is (571) 270-3231. The examiner can normally be reached on Monday - Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marvin Lateef can be reached on (571) 272-5026. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JP
10/15/07

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